Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2007 Monitoring Summary

Little Clear Creek at Winston County Road 369 (34.12919/-87.50901)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Little Clear Creek watershed for biological and water quality monitoring as part of the 2007 Assessment of the Black Warrior and Cahaba (BWC) River Basins. The objectives of the BWC Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the BWC basin group. Due to minimal flow conditions caused by beaver dams, macroinvertebrate and habitat assessments were not conducted at this station.

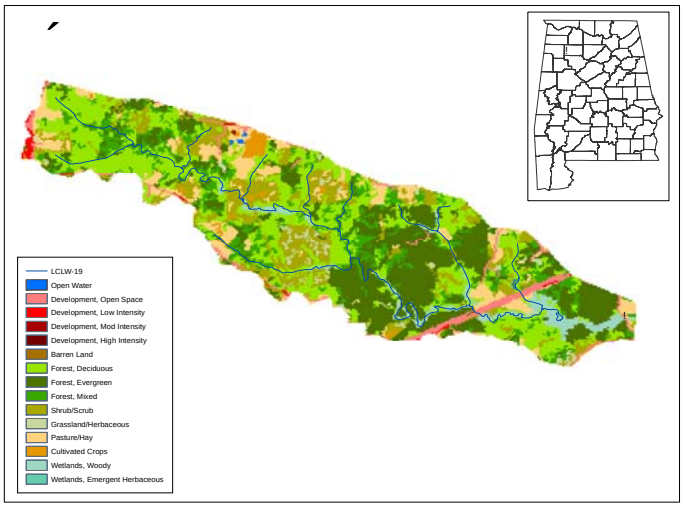

Figure 1. Landuse of Little Clear Creek at LCLW-19.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Black Warrior River
Drainage Area (mi^2)		8
Ecoregion[a]		68e
% Landuse		
Open water		<1
Wetland	Woody	4
Forest	Deciduous	29
	Evergreen	25
	Mixed	12
Shrub/scrub		14
Grassland/herbaceous		2
Pasture/hay		9
Cultivated crops		1
Development	Open space	3
	Low intensity	1
	Moderate intensity	<1
Barren		<1
Population/km^2[b]		19
# NPDES Permits[c]	**TOTAL**	2
Construction Stormwater		1
Industrial General		1

a.Dissected Plateau

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, February 23, 2011.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Clear Creek is a *Fish & Wildlife (F&W)* stream located in the Dissected Plateau ecoregion. Based on the 2000 National Land Cover dataset, landuse within the watershed is primarily forested (66%, Figure 1). Population density is relatively low in this area. As of February 23, 2011, the Department has issued two NPDES permits in this watershed.

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 2. When possible, in situ measurements and water samples are collected monthly, semi-monthly (metals), or quarterly (pesticides, atrazine, and semi-volatile organics) during March through October to help identify any stressors to the biological communities.

On August 8, 2007, dissolved oxygen fell below the 5.0 mg/L *F&W* water use classification criteria. Low stream flow (0.8 cfs) due to beaver dam construction may be the cause of this exceedance. Dissolved copper and nickel concentrations exceeded the chronic freshwater aquatic life use criteria during one of three sampling events. Chloride, total iron and manganese, and dissolved aluminum and manganese concentrations were higher than background levels based on the 90th percentile of reference reach data in this ecoregion.

SUMMARY

Concentrations of some metals and chlorides were elevated as compared to data from ADEM's least-impaired reference reaches in the Dissected Plateau ecoregion. However, stream flow was very low during much of the sampling period due to beaver dams upstream and downstream of the reach, as well as drought conditions throughout the basin. Consequently, this reach should be re-evaluated for monitoring during the 2012 Black Warrior / Cahaba River assessment.

Table 2. Summary of water quality data collected March-October, 2007. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median, average (Avg), and standard deviations (SD) values were calculated by multiplying the MDL by 0.5 when results were less than this value.

Parameter	N	Min	Max	Med	Avg	SD	E
Physical							
Temperature (°C)	8	13.7	24.2	18.6	19.2	3.7	
Turbidity (NTU)	8	5.3	26.9	8.4	10.4	7.2	
Total Dissolved Solids (mg/L)	7	12.0	91.0	40.0	40.3	27.0	
Total Suspended Solids (mg/L)	7	2.0	15.0	4.5	6.5	4.6	
Specific Conductance (µmhos)	8	24.7	31.9	27.2	28.2	2.5	
Hardness (mg/L)	3	4.5	17.0	9.0	10.2	6.3	
Alkalinity (mg/L)	7	8.1	10.7	9.6	9.6	1.0	
Stream Flow (cfs)	7	0.8	10.0	4.8	4.9	4.0	
Chemical							
Dissolved Oxygen (mg/L)	8	4.7[C]	9.1	6.7	6.8	1.4	1
pH (su)	8	6.2	6.8	6.6	6.5	0.2	
Ammonia Nitrogen (mg/L)	7	<0.015	0.061	0.008	0.015	0.020	
Nitrate+Nitrite Nitrogen (mg/L)	7	0.060	0.142	0.121	0.107	0.032	
Total Kjeldahl Nitrogen (mg/L)	7	<0.150	0.413	0.248	0.245	0.135	
Total Nitrogen (mg/L)	7	<0.153	0.482	0.378	0.352	0.131	
Dissolved Reactive Phosphorus (mg/L)	7	0.010	0.043	0.016	0.022	0.015	
Total Phosphorus (mg/L)	7	0.018	0.040	0.027	0.028	0.008	
CBOD-5 (mg/L)	7	<1.0	1.7	1.2	1.0	0.5	
[J] Chlorides (mg/L)	7	1.0	2.0	1.4[M]	1.5	0.3	
Atrazine (µg/L)	2	<0.05	0.07	0.05	0.05	0.03	
Total Metals							
Aluminum (mg/L)	3	<0.150	<0.500	0.250	0.230	0.072	
Iron (mg/L)	3	0.800	1.910	1.800[M]	1.503	0.612	
Manganese (mg/L)	3	0.061	0.137	0.089[M]	0.096	0.038	
Dissolved Metals							
Aluminum (mg/L)	3	<0.015	<0.500	0.140[M]	0.132	0.121	
Antimony (µg/L)	3	<1.6	<7.5	1.0	1.8	1.6	
Arsenic (µg/L)	3	<0.5	<5.0	1.1	1.3	1.1	
Cadmium (mg/L)	3	<0.0003	<0.005	0.000	0.001	0.001	
Chromium (mg/L)	3	<0.002	<0.005	0.002	0.002	0.001	
Copper (mg/L)	3	<0.002	0.008[S]	0.002	0.004	0.004	1
Iron (mg/L)	3	0.200	0.570	0.490	0.420	0.195	
Lead (µg/L)	3	<1.1	<5.0	0.7	1.3	1.1	
Manganese (mg/L)	3	0.080	0.140	0.110[M]	0.110	0.030	
[J] Mercury (µg/L)	3	<0.3	<0.5	0.2	0.2	0.1	
[J] Nickel (mg/L)	3	<0.005	0.007[S]	0.003	0.004	0.002	1
Selenium (µg/L)	3	<1.6	<7.5	0.8	1.8	1.7	
Silver (mg/L)	3	<0.0008	<0.003	0.0	0.0	0.0	
Thallium (µg/L)	3	<0.6	<9.0	0.6	1.8	2.3	
Zinc (mg/L)	3	<0.002	<0.006	0.002	0.002	0.001	
Biological							
[J] Chlorophyll a (ug/L)	7	<0.10	2.67	0.67	0.77	0.93	
[J] Fecal Coliform (col/100 mL)	7	10	650	80	242	281	

C=F&W criterion violated; E=# samples that exceeded criteria; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 68e; N=# samples; S=F&W hardness-adjusted aquatic life use criteria exceeded.

FOR MORE INFORMATION, CONTACT:
Brien Diggs ADEM
Environmental Indicators Section
1350 Coliseum Boulevard
Montgomery, AL 36110
(334) 260-2750 lod@adem.state.al.us